TABLE 3.4

SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS --SURFACE WATER INVESTIGATION
OU2 RI/FS WORK PLAN
SOUTH DAYTON DUMP AND LANDFILL SITE
MORAINE, OHIO

DQO Step:	Medium:	Surface Water		
	Investigation Phase:	Phase 1A	Phase 1B	Phase 1C
	Investigation Item:	Comparison to Ambient Water Quality Criteria	Comparison to Upstream Conditions	Quarry Pond Surface Water Sampling
1 State the Problem				
	i) Problem description	Surface water samples have not previously been obtained from the Great Miami River (GMR) as it flows past by the Site. It is unknown whether and to what extent the Site has any measurable impact on water quality in the GMR. Intermittent drainage pathways have not been identified at the Site to date.		Limited historic surface water samples have been obtained from the Quarry Pond (QP). Historic QP surface water samples did not contain any VOCs. No other parameters were assessed. The impact of Site contaminants on the QP is not known. Intermittent drainage pathways have not been identified at the Site to date.
	ii) Planning team	See note at bottom		
	iii) Conceptual model	- Shallow groundwater from the Site typically flows towards the west and/or north towards the GMR, which could carry contaminants into its surface waters. - Erosion of surface soils from the Site could also carry Site-related contaminants to the GMR, which is at a lower elevation, via overland surface flow. - During flood events, any potential GMR contaminants originating off-Site could affect the Site. - Greater contaminant concentrations may be present at groundwater discharge points into the GMR and this will be investigated through sampling completed along transects.		- Shallow and deep groundwater from the Site typically flows towards the west towards the QP, which could carry contaminants into the QP. - During flood events, off-Site contaminants could be deposited in the QP. - Erosion of surface soils from the Site could also carry Site-related

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DQO Step:	*Medium:* / *Investigation Phase:* / *Investigation Item:*	*Surface Water* *Phase 1A* *Comparison to Ambient Water Quality Criteria*	*Phase 1B* *Comparison to Upstream Conditions*	*Phase 1C* *Quarry Pond Surface Water Sampling*
		- Persons can come into contact with river water when using the river for recreation. - Wildlife and aquatic organisms are in contact with and ingest GMR water.		contaminants to the QP, which is at a lower elevation, via overland surface flow. - Persons can come into contact with pond water when using the pond area for recreation. - Wildlife and aquatic organisms are in contact with and ingest QP water.
iv) General intended use for data		The data collected will be compared against ambient water quality criteria to assess if human or aquatic ecosystem health is potentially impaired. In addition, CRA will visually inspect the bank of the GMR adjacent to the Site for evidence of discharges potentially related to the Site (i.e., erosion rills, iron oxidation, turbidity, etc.). Sample locations will be matched up with Site discharges, if observed. The data collected will ultimately be used in the Baseline Risk Assessment for OU2.	The data collected from sampling locations along the Site's boundaries will be compared to upstream (background) conditions, to determine if there are any measurable inputs of contaminants from the Site. The data collected will ultimately be used in the Baseline Risk Assessment for OU2.	The data collected will be compared against ambient water quality criteria to assess if human health or aquatic ecosystem health is potentially impaired. In addition, CRA will visually inspect the Quarry Pond embankments for evidence of discharges (i.e., erosion rills, iron oxidation, turbidity, etc.). Sample locations will be matched up with Site discharges, if observed. The data collected will ultimately be used in the Baseline Risk Assessment for OU2.
v) Resources, constraints,		Surface water quality and storm water runoff may be influenced by rainfall events, water temperature and other seasonal effects, which requires monitoring at different times of the year and under different conditions. Surface water sampling may		

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	Investigation Item:	*Comparison to Ambient Water Quality Criteria*	*Comparison to Upstream Conditions*	*Quarry Pond Surface Water Sampling*
deadlines		not be possible during high flows. Surface water and storm water runoff sampling may not be possible during ice-cover conditions. Surface water sampling will be completed during low flow periods where contaminants entering via groundwater would present the greatest risks. Storm water runoff sampling will be completed following rainfall events should a significant runoff pathway be identified. Intermittent drainage pathways have not been identified at the Site to date.		
2 ***Goals of the Study:***				
i) Primary study question		Does surface water quality fail to meet ambient water quality criteria for protection of human health (direct contact and ingestion) and aquatic organisms?	Does the Site add contaminants to surface water in the GMR as it flows past the Site? If so, to what extent?	Does surface water quality fail to meet ambient water quality criteria for protection of aquatic organisms and human health (trespassers)?
ii) Alternate outcomes or actions		- If sampling demonstrates that ambient water quality criteria are met, no further monitoring is planned.	- If sampling demonstrates conditions adjacent to the Site are less than or equal to those found upstream, no further monitoring is planned.	- If sampling demonstrates that ambient water quality criteria are met, no further monitoring is planned.

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Medium:	*Surface Water*		
Investigation Phase:	*Phase 1A*	*Phase 1B*	*Phase 1C*
DQO Investigation Item:	***Comparison to Ambient Water Quality Criteria***	***Comparison to Upstream Conditions***	***Quarry Pond Surface Water Sampling***
Step:			
	- If sampling demonstrates that criteria are not met, comparison with background conditions is warranted.	- If sampling demonstrates conditions are greater than upstream, and that contaminant concentrations are greater than Action Level criteria (see Phase 1A to left), further evaluation and/or control measures may be warranted.	- If sampling demonstrates that criteria are not met, further evaluation and/or control measures may be warranted.
iii) Type of problem (decision or estimation)[1]	Decision (Action Level)		
iv.a) Decision statement	Determine whether any contaminants are present at concentration greater than ambient water quality criteria in the GMR as it flows past the Site.	Determine whether any measurable input of contaminants from the Site, relative to upstream conditions, occurs in the GMR as it flows past the Site.	Determine whether any contaminants are greater than ambient water quality criteria in the Quarry Pond.
iv.b) Estimation statement & assumptions	--		

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DQO Step:		Medium: Surface Water		
	Investigation Phase: / Investigation Item:	*Phase 1A* *Comparison to Ambient Water Quality Criteria*	*Phase 1B* *Comparison to Upstream Conditions*	*Phase 1C* *Quarry Pond Surface Water Sampling*
3	***Identify Information Inputs:***			
	i) Information types needed	Surface water sample analysis is required to assess conditions in the GMR as it flows past the Site.		Surface water samples are required to assess conditions in the Quarry Pond.
	ii) Information sources	New data from the investigation will form the basis of assessment.		New data from the investigation will form the basis of assessment.
	iii) Basis of Action Level	Action Levels are: - Ambient water quality criteria (Ohio drainage basin) - Ohio EPA Aquatic Life and Human Health Tier 1 and II Values - USEPA RSL (tapwater)	The selected Action Level is a Background Threshold Value (e.g., 95th percentile) based on upstream conditions.	Action Levels are: - Ambient water quality criteria (Ohio drainage basin) - Ohio EPA Aquatic Life and Human Health Tier 1 and II Values - USEPA RSL (tapwater)
	iv) Appropriate sampling & analysis methods	Methods are described in the Field Sampling Plan (CRA, January 2011), CRA's Standard Operating Procedures, and the Quality Assurance Project Plan (CRA, September 2008). VOC samples will be collected using a peristaltic pump to minimize sample aeration while allowing for sample preservation. All other parameters will be sampled by directly dipping sample containers in the surface water body (GMR or Quarry Pond).		

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4	***Define the Boundaries of the Study:***			
i) Target population, sample units		The target population is all water flowing in the GMR as it flows past the Site. The sampling units are individual grab samples collected from the GMR, divided into upstream and near-Site reaches.		The target population is all water in the Quarry Pond. The sampling units are individual grab samples collected from the Quarry Pond.
ii) Specify spatial boundaries		In order to ensure that any potential contributions from nearby facilities (e.g. former GM-Delphi plant) are accounted for, CRA proposes to specify upstream sampling locations as those occurring to the east of Dryden Road, on the near-Site side of any dams. Near-Site sampling locations are those occurring to the west of Dryden Road (i.e., as surface water flows past the Site), and these will be located on the near (south/east) shore of the GMR. Due to the industrial activity in the area, chemical use and contaminants in the area may have been used by more than one facility. In order to establish whether contamination is or has resulted from Site activities, the background locations have been set close to the Site.		Spatial boundaries are the boundaries of Quarry Pond surface water.
iii) Specify temporal boundaries		The temporal boundaries are defined by the duration of monitoring, which will occur over two sampling rounds		The temporal boundaries are defined by the duration of monitoring, which will occur over two sampling rounds.

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iv) Identify any other practical constraints		Sampling may be postponed due to flooding or iced conditions in the GMR. The outfall of the City of Dayton Waste Water Treatment Plant across the river GMR, just south of the downstream limit of the Site, may substantially impact downstream water quality, making any subsequent Site effects difficult to discern. If any dams/weirs are encountered, samples will be collected from the side of the dam closest to the Site (i.e., downstream of any upstream dams, and upstream of any downstream dams). Dilution of contaminants is likely towards the center and far bank of the GMR, and increases with distance downstream of the Site.		Sampling may be postponed due to flooding or iced conditions in the Quarry Pond.
v.a) Scale of inference for decision making		Comparisons to Action Levels will be carried out on an individual-location basis. For the RA, the 95% UCL of the mean concentration in an exposure unit will be used. A single exposure unit will be applied for the GMR.	Comparisons to upstream conditions will be carried out on an individual-location basis.	Comparisons to Action Levels will be carried out on an individual-location basis.
v.b) Scale of estimates		--		